Challenges Faced by Government Research Institutions and Public Universities in the Commercialization of Agricultural Innovation in the Philippines

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Presentation Outline

- Introduction – PHL Agricultural Innovation System
- Challenges in Commercializing Agricultural Innovation
- Recent Developments that Favor Commercialization
- Concluding Remarks
Philippine Agric’l Innovation System

• Department of Agriculture (DA)
  • Network of 48 organizations: Bureau of Agricultural Research (BAR) and attached agencies assigned to develop carabao, coconut, cotton, fisheries, food, livestock, rice, sugar, etc.

• Department of Science and Technology (DOST)
  • 5 attached RDIs with varying levels of agricultural R&D
  • PCAARRD operates thru 13 regional R&D consortia with more than 100 SUCs and RDIs

• Higher education institutions (HEIs)
  • 2,282 HEIs: 1,636 private; 536 main and satellite campuses of SUCs; 94 local universities and colleges, 16 other government HEIs
  • In 2011: 97 SUCs with forestry courses; at least 106 SUCs with agriculture programs
Philippine Agric’l Innovation System

• DA has largest share of public spending on agri in 2000-2014
  • 86% is dedicated to Agriculture and Fisheries Modernization Plan
• Public agricultural R&D spending was US$129 M 2005 PPP dollars in 1996; US$139 M in 2002; and US$133 M in 2008
• Public HEIs on average contributed almost 43% of total to public agricultural R&D
• Top socio-economic objective of R&D was for agricultural production and technology, with 23% of total expenditures
CHALLENGES IN COMMERCIALIZING AGRICULTURAL INNOVATION
Low level of agricultural R&D funding

- Philippine government’s agricultural R&D spending remains low at about 0.13% of GVA in agriculture from 2003-2011
  - arguably the main challenge in Philippine agricultural innovation
- Philippines needs to meet 1% of GDP benchmark set by WB and UNESCO
- Other ASEAN members have higher R&D-spending-to-GDP ratio
  - Myanmar (0.16%); Vietnam (0.19%); Thailand (0.27%);
  - Malaysia (0.63%); Singapore (2.27%)
Low number of researchers/scientists

- Total number of R&D personnel is 10,277
- 24% or 2,480 are researchers in agricultural science
  - 1,283 (52%) are in the government
  - 47.8% worked in the public (1,145) and private HEIs (41)
  - 11 researchers (0.44%) are in private non-profit organizations

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<th>No. of R&amp;D Personnel</th>
<th>No. of Key Researchers</th>
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<td>UNESCO Reqt</td>
<td>380/M population</td>
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Low level of scientific & technological outputs

• Most RDIs and SUCs are engaged in adaptive research, not so much on basic researches
  • Also reflective of the low budget allocated to R&D in these institutions
• Patents granted to local inventors is only 5% of total (2000-2011)
• SUCs have 494 IPRs filed by and granted; public RDIs have 351
• Publish or perish mindset: 2011 IIPi study showed that 27.5% of 1,000 articles from 9 RDIs published between 2000 and 2010 have patent potential
• Philippines, compared w/ other ASEAN countries, has the lowest number of scientific articles published from 2002-2011
Culture of IP-generating institutions needs to improve

- SUCs operated as ivory towers disconnected from practice and society with research and teaching being the core activities, and unconcerned with commercialization
- RDIs still need to develop a deeper understanding and appreciation of IP management
- Staff manning TTOs are still engaged in other functions
- Unsystematic disclosure process, and
- Distrust/lack of confidence within the agency
Culture of IP-generating institutions needs to improve

- Lack of capability to identify, protect and commercialize IPs on their own
- Not enough professionals are available (patent agents; valuation and FTO experts, etc)
- Coordination needed between technical and economics/agribusiness departments
- Funding gaps on IP management exist
- Lack of incentives for IP Protection, technology transfer and commercialization milestones
Researcher mindset remains a challenge

• Believes patenting and commercialization processes are tedious
• Wants to focus only on research
• Public Funds = Public Good
• Lacks entrepreneurship culture and skills
• Needs financial support to commercialize
• Views patents/invention reputation-gaining than financial benefits
Human capital needs a boost

- Researchers need capacitation
- Researchers at a loss on pre-commercialization reqts
  - business plans, market research, feasibility studies
  - technology valuation; negotiations and licensing agreements
- Need for adequate number of patent agents and pre-commercialization professionals has to be addressed
- Funding donors and RDIs must allocate funds to engage their services
Low public-private R&D collaboration

- Public-private R&D collaboration is practically non-existent
- Gov’t RDIs do not have the flexibility, accountability, incentives, and fiscal autonomy to create opportunities for cooperative research with the private sector, or with the universities
- Private sector proves nill in responding to opportunities particularly in business ventures requiring the use of new technologies
- Cultural barriers exist between government academia and RDIs and the industry; entrepreneurs/business leaders have been slow to embrace academic entrepreneurship
- Philippines does not have specific policy measures targeting the promotion of R&D from abroad thus impeding collaboration with RDIs of developed countries
Commercialization opportunities need to improve

- TBIs and accelerators need to increase
- Support to start-ups in government RDIs and SUCs are important
- Access to critical start-up services needed
Successes in commercialization are few and far in between

• Very low turn-out of technologies = low rate of commercialization and adoption of intended users

• From 258 technologies derived from DOST-funded R&D: 3% have partnership/ licensing agreements; 28% have no takers; 65% are deployed/ rolled out

• Bio-N; ‘Sinta’ hybrid papaya; Biogroe

• Flower induction in mango
  • Probably the technology with the most impact in an industry
  • Inventor chose not to enforce his patent; and shared his technology freely
RECENT DEVELOPMENTS THAT FAVOR COMMERCIALIZATION
Agricultural R&D funds are increasing

• PCAARRD and DA-BAR received budget increases of 41% and 53% annually, respectively from 2010 to 2013

• PCAARRD’s increased its budget for R&D and technology delivery services, from 57.77% in 2010 to 65.30% in 2012

• DA-BAR augmented funding for the national programs on rice, corn, high value commercial crops and promotion and development of organic agriculture
Agricultural researchers and scientists are increasing

- DOST scholarship programs received a 2014 budget of US$37 million
  - Supported 12,397 undergraduate, 2,121 masteral and 712 doctorate students
- AANR component of DOST granted 252 scholarships from 2007-2013
  - 241 has already graduated with MS degrees and PhD degrees
- DA allocated US$2.6 million for students who will take courses on agriculture, forestry, fisheries and veterinary medicine in selected SUCs
Policy environment now favors commercialization

- Intellectual Property Code of the Philippines
- Inventors and Invention Incentives Act
- Magna Carta for Scientists, Engineers, Researchers and other S&T Personnel in Government
- Plant Variety Protection Act
- Philippine Technology Transfer Act of 2009
- RA 10372 amended IP Code, and mandated all schools and universities to have their own institutional IP policies.
- DOST IP Policy; Tech Transfer Protocol for GFAs and RDIs; Fairness Opinion Report; and Guidelines on IP Valuation, Commercialization and Information Sharing
REPUBLIC ACT 10055: TECHNOLOGY TRANSFER ACT OF 2009

RDIs and universities are "default" owners of IPs

Researchers share in royalties

GFAs ensure RDIs protect and manage IPs

Allows spin offs

Government Funding Agencies (GFA)

Gov’t RDIs

Universities

- Government enunciates primacy of tech transfer and not income earning
- Provides for management of conflict of interests
- Provides public (open) access policy

EXPECTED RESULTS

Increased:
- ROI from government
- R&D investments
- More innovations
Technology transfer offices are being formed

- TTOs assist and stimulate technology transfer
- In 2010, the IPOPHL launched *Innovation and Technology Support Offices* (ITSO) within RDIs and HEIs
  - to strengthen local institutional capacity in providing patent services
- 85 ITSOs established all over the Philippines, 41 of which are located in SUCs and five are with RDIs
- These ITSOs have also served as, or assisted, their TTOs
- Patent applications have risen dramatically since then
Commercialization programs have been crafted and implemented

PCAARRD launched the DOST-PCAARRD Innovation and Technology Center in March 2016

- a one-stop hub for technology owners and generators, investors, end users and other stakeholders;
- >US$ 2M for the next five years to support IP management and pre-commercialization initiatives;
- > 20 technologies scheduled for commercialization in 2017
Commercialization programs have been crafted and implemented

- DOST-Technology Application and Promotion Institute offers
  - IPR Assistance Program;
  - DOST-Academe Technology-based Enterprise Development Program;
  - Venture Financing Program;
  - Technology Innovation Program;
  - Prototype Development Program;
  - Pilot Plant Assistance Program; and
  - Invention Guarantee Fund

- DOST Regional Offices have Small Enterprise Technology Upgrading Program
Commercialization programs have been crafted and implemented

- DOST agencies are now mandated to allocate at least 10% of R&D budget to tech transfer, incl commercialization
- In 2016, DOST launched a program to establish and strengthen seven agri-related TBIs
- DOST conducted the Technology Transfer Day in two separate venues in April and September 2016
  - facilitated signing of licensing agreements for 30 technologies
Support Needed to Fast track Agri-Innovation Commercialization

- GOVERNMENT – policy support, regulation, standards, technologies, infrastructure, seed funds, services, common shared facilities, others

- PRIVATE SECTOR – markets, financing, business networks, others

- ACADEME – training, technologies, expert services, others

- NGOs, INGOs – capacity building services, seed funds, CSFs, others

- COMMUNITIES – agri-aqua resources, physical, human, others
Concluding Remarks

- Commercialization challenges abound, starting from the R&D phase
- A lot need to be done to address challenges in the commercialization of agricultural innovation
- Technology Transfer Act changed the way we do R&D, especially technology transfer
- Prospects are bright, but efforts should be concerted and sustained
Thank You!

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